Naval Education and Training Command

NAVEDTRA 82525
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0503-LP-213-2200

Nonresident Training Course (NRTC)

Construction Electrician 1

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

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Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this material.

CONSTRUCTION ELECTRICIAN 1
NAVEDTRA 82525

Prepared by the Naval Education and Training Professional Development
and Technology Center (NETPDTC), Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program, You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the associated text or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The text for this course is *Illustrator Draftsman, Volume 4-Presentations Graphics,* NAVEDTRA 12723-A. The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS: After studying the associated text, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the text. You may refer freely to the text and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

ANSWER SHEETS: You must use answer sheets designed for this course (NETPMSA Form 1430/5, Stock Ordering Number 0502-LP-216-0100). Use the answer sheets provided by Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet.

SUBMITTING COMPLETED ANSWER SHEETS: As a minimum, you should complete at least one assignment per month. Failure to meet this requirement could result in disenrollment from the course. As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time.

GRADING: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, your ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

COURSE COMPLETION: After you have submitted all the answer sheets and have earned at least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

NAVAL RESERVE RETIREMENT CREDIT: If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 3 points. (Refer to BUPERSINST 1001.39 for more information about retirement points.)

STUDENT QUESTIONS: If you have questions concerning the administration of this course, consult your ESO. If you have questions on course content, you may contact NETPDTC at:

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COURSE OBJECTIVES: In completing this nonresident training course, you will demostrate a knowledge of the subject matter by correctly answering questions on the following subjects: copy preparation, audiovisual presentations, television graphics, and displays and exhibits.

Naval courses may include several types of questions--multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses use all of the types of questions available. You can readily identify the type of each question, and the action required, by reviewing of the samples given below.

MULTIPLE-CHOICE QUESTIONS

Each question contains several alternative answers, one of which is the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-l. The first U.S. Navy nuclear-powered vessel was what type of ship?

1. Carrier
2. Submarine
3. Destroyer
4. Cruiser

Indicate in this way on your answer sheet:

	1	2	3	4
	T	F		
s-1	□	■	□	□

TRUE-FALSE QUESTIONS

Mark each statement true or false as indicated below. If any part of the statement is false, the entire statement is false. Make your decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. Shock will never be serious enough to cause death.

1. True
2. False

Indicate in this way on your answer sheet:

	1	2	3	4
	T	F		
s-2	□	■	□	□

MATCHING QUESTIONS

Each set of questions consists of two columns, each listing words, phrases or sentences. Your task is to select the item in column B which is the best match for the item in column A. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on your answer sheet.

SAMPLE

In answering questions s-3 through s-6, SELECT from column B the department where the shipboard officer in column A functions. Responses may be used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Department
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	4. Navigation Department

Indicate in this way on your answer sheet:

	1	2	3	4
	T	F		
s-3	□	■	□	□
s-4	■	□	□	□
s-5	□	□	■	□
s-6	■	□	□	□

Assignment 1

Textbook Assignment: "Area Lighting Systems." Pages l-l through 1-29.

Learning Objective: Identify the various types of components, circuits, and controls for area lighting systems.

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l-l. Which of the following is one of the primary problems associated with incandescent light bulbs?

1. Aging
2. Manufacturing
3. Durability
4. Installation

1-2. Which of the following devices prevents increased current flow as electric-discharge lamps heat up?

1. Constant-current regulator
2. Isolation transformer
3. Ballast
4. Capacitors

1-3. What is the main drawback of the older type of sodium lights?

1. Poor color quality
2. High initial cost
3. Increased maintenance cost
4. Reduced light output

1-4. The base of high-intensity-discharge lighting should be maintained below what maximum temperature?

1. 190°F
2. 210°F
3. 400°F
4. 500°F

1-5. Which of the following procedures will reduce the stroboscopic effect produced by AID lights?

1. Install incandescent lamps in every other fixture
2. Connect HID lights in a series wiring circuit
3. Maintain a constant current on CCR transformer
4. Connect adjacent lamps to different power phases

1-6. High-intensity mercury-vapor and metal-halide lamps should NOT be operated if the outer globe is broken, punctured, or missing.

1. True
2. False

1-7. What special precautions must be taken if HID equipment is installed in a series wiring circuit?

1. Provide protection from high voltages that occur during hot restarts
2. Ensure that the ballast is mounted within 24 inches of the lamp fixture
3. Install timers to prevent the lamps from starting at the same time
4. Use HID equipment only in overhead series circuits

1-8. Fluorescent lamps use what type of interior coating to give off light?

1. Mercury
2. Sodium
3. Metal halide
4. Phosphor

1-9. Ballasts provide which of the following functions?

1. Limit current flow through the lamp
2. Provide correct voltage to the lamp
3. Provide power factor correction
4. All of the above

1-10. A thermally protected ballast approved by Underwriter's Laboratories is classified as a

1. Class A ballast
2. Class D ballast
3. Class P ballast
4. Class T ballast

1-11. Which of the following devices are used with lamp fixtures to change the quality of light produced?

1. Reflectors
2. Lenses
3. Both 1 and 2 above
4. Hard glass covers

1-12. When HID lighting fixtures are mounted on poles, the ballasts should be mounted

1. at the base of each pole
2. within 24 inches of the light fixture
3. in a group, close to the distribution transformer
4. as close to the constant-current regulator as possible

1-13. A constant-current regulator is sized to provide 6.6 amperes of current to a lighting circuit. If higher amperage is required, which of the following devices are used to increase the current capacity?

1. Current transformers
2. Autotransformers
3. Distribution transformers
4. Potential transformers

1-14. Which of the following devices prevents a lamp failure from interrupting the entire series circuit?

1. Isolation transformer
2. Ballast
3. Constant-current regulator
4. Film-disk cutout

1-15. When you are running conductors over a great distance to supply streetlights in a parallel circuit, which, if any, of the following is a DISADVANTAGE?

1. Excessive voltage drop
2. Excessive current drop
3. Difficulty in troubleshooting
4. None of the above

1-16. If both conductors of a series lighting circuit are installed on the same pole, the system is known as what type of circuit?

1. Radial-loop
2. Open-loop
3. Combination-loop
4. Closed-loop

1-17. Insulators that are installed on series streetlighting circuits should be of what color to distinguish them from those on other distribution circuits?

1. Gray
2. Blue
3. Brown
4. White

1-18. On series streetlighting circuits, what size of hard-drawn copper conductor is normally used?

1. No. 10 AWG
2. No. 8 AWG
3. No. 6 AWG
4. No. 4 AWG

1-19. Which of the following factors determines the output voltage rating of a transformer supplying streetlighting in a parallel circuit?

1. Voltage rating of the individual lamps
2. Current rating of the individual lamps
3. Voltage drop of the lighting circuit
4. Size of the secondary conductor

1-20. What is the basic principle involved in the operation of a constant-current regulator?

1. A balanced lever reacts to current flowing through its springs
2. The moving coil reacts directly to the change in oil temperature in the cooling fins
3. The moving coil clamps hold the moving coil away from the stationary coil according to load demand
4. The moving coil moves within the magnetic field of the stationary to provide the desired secondary current

1-21. Constant-current regulators may be overloaded to what percent without damage to the regulator?

1. 5
2. 10
3. 15
4. 20

1-22. Which of the following devices may be installed to relieve constant-current transformers that are slightly overloaded?

1. Autotransformers
2. Potential transformers
3. Booster transformers
4. Isolation transformers

IN ANSWERING QUESTION 1-23, REFER TO TABLE l-l IN YOUR TEXTBOOK.

1-23. To supply 140 1,000-lumen, 6.6-ampere, straight-series lamps, you would need a regulator of what size?

1. 7.5 kW
2. 10 kW
3. 15 kW
4. 20 kW

Learning Objective: Identify the spacing and height requirements for street-lighting luminaires.

IN ANSWERING QUESTIONS 1-24 THROUGH 1-26, SELECT FROM COLUMN B THE TYPE OF STREET CLASSIFICATION THAT MATCHES THE DEFINITION GIVEN IN COLUMN A. NOT ALL RESPONSES IN COLUMN B ARE USED.

	A. DEFINITIONS	B. TYPES OF STREET CLASSIFICATION
1-24.	Roadways used primarily for direct access to residential, commercial, or industrial areas	1. Intermediate
1-25.	Roadways that serve as the principal network for through traffic	2. Collector
1-26.	Roadways serving traffic between major and local roadways	3. Local
		4. Major

1-27. What type of luminaire should you select to light a roadway if the luminaire is to be mounted on the side of the roadway with a width of not over 2.7 times the mounting height?

1. Type I
2. Type II
3. Type III
4. Type IV

IN ANSWERING QUESTIONS 1-28 THROUGH 1-30, SELECT FROM COLUMN B THE STREET-LIGHT MOUNTING TERMINOLOGY THAT MATCHES THE DEFINITION GIVEN IN COLUMN A. NOT ALL RESPONSES IN COLUMN B ARE USED.

	A. DEFINITION	B. STREET-LIGHTING MOUNTING TERMINOLOGY
1-28.	Distance measured up and down the length of a road	1. Transverse direction
1-29.	Distance measured across the width of the road	2. Longi-tudinal direction
1-30.	Dimension between the curb and a point directly below the light fixture	3. Overhang
		4. Mounting height

1-31. When the width of a roadway approaches two mounting heights wide, what mounting arrangement should be used?

1. Opposite
2. Staggered
3. One-side
4. Overlap

1-32. Which of the following statements best describes the information that can be obtained from a utilization curve?

1. The total amount of light generated by the luminaire
2. The amount of usable light that actually strikes the area to be lighted
3. The amount of overlap provided by the luminaire
4. The total amount of light generated by the luminaire after 2 years of operation

1-33. Which part of the manufacturer's literature shows the magnitude and direction of illumination at any point on the roadway surface?

1. Isofootcandle curve
2. Utilization curve
3. Maintenance factor
4. Coefficient of utilization

1-34. The factor used in lighting calculations to compensate for gradual losses of illumination is known as what kind of factor?

1. Lamp
2. Uniformity
3. Illumination
4. Maintenance

1-35. Which of the following factors influence(s) the selection of the luminaire?

1. Budget constraints
2. Availability
3. Stock levels in the supply system
4. All of the above

1-36. What must be calculated before the coefficient of utilization can be determined?

1. Amount of wasted light on the street side
2. Amount of wasted light on the house side
3. Both 1 and 2 above
4. Amount of light produced by the luminaire

1-37. The uniformity of illumination is expressed in terms of a ratio of

1. $\frac{\text{average fc}}{\text{minimum fc}}$
2. $\frac{\text{average fc}}{\text{maximum fc}}$
3. $\frac{\text{maximum fc}}{\text{minimum fc}}$
4. $\frac{\text{initial fc}}{\text{average fc}}$

1-38. How can the minimum value of light striking a roadway surface be determined?

1. By calculating the coefficient of utilization
2. By plotting the roadway on an isofootcandle curve
3. By multiplying the lamp factor by the maintenance factor
4. By plotting the roadway on a topographical map

Learning Objective: Identify the spacing and height requirements for floodlight luminaires.

1-39. When you are installing a floodlight system, it is more efficient to use a larger number of small floodlights than to use a smaller number of large floodlights.

1. True
2. False

IN ANSWERING QUESTION 1-40, REFER TO FIGURE 1-19 IN YOUR TEXTBOOK.

1-40. The National Electrical Manufacturer's Association (NEMA) has classified floodlighting luminaires into how many types according to beam spread degrees?

1. 10
2. 9
3. 7
4. 4

1-41. The suggested area that can be covered by a single pole is how many times the mounting height?

1. Five
2. Two
3. Three
4. Four

1-42. If the corner poles are NOT used in perimeter locations, the distance from the last pole to the edge of the area should NOT exceed how many times the mounting height?

1. Five
2. Two
3. Three
4. Four

1-43. The 2X-4X rule can be used to calculate the

1. number of floodlights per pole
2. height of the poles
3. lighting intensity of the area
4. minimum number of poles

1-44. The highest light level a floodlight can produce at a distance from the pole occurs when the maximum intensity is aimed to form approximately a 3, 4, 5 triangle.

1. True
2. False

1-45. The 3, 4, 5 triangle aiming method can be useful for determining

1. spacing between the poles
2. height of the pole
3. number of floodlights per pole
4. maximum number of poles

1-46. When selecting lighting fixtures to light an area, always select a fixture that has a beam spread that is

1. less than the area
2. sufficient to cover the area
3. greater than the area
4. twice as large as the area

1-47. The performance specifications of each model, type, and size of luminaire can be obtained from

1. the manufacturer's literature
2. the IES Lighting Handbook
3. the National Electrical Code®
4. NAVFAC MO-200

1-48. What piece of manufacturer's literature shows what the light level will be at any given point?

1. Utilization data
2. NEMA classification number
3. Isofootcandle diagram
4. Maintenance factor

1-49. The initial footcandle table gives the footcandle value for each isofootcandle curve based on the

1. mounting height of the pole
2. number of fixtures per pole
3. utilization data
4. NEMA classification number

1-50. You can determine the average lumens per square foot of a given area by using the

1. maintenance factor
2. utilization graph
3. isofootcandle diagram
4. photometric test data

1-51. Which of the following maintenance factors may be used for an open floodlamp when the manufacturer's literature is not available?

1. 0.50
2. 0.56
3. 0.65
4. 0.76

Learning Objective: Identify the components and controls for security lighting.

1-52. Security lighting at activities should provide enough light to do which of the following tasks?

1. Identify personnel
2. Prevent illegal entry
3. Detect intruders
4. All of the above

1-53. Which of the following statements concerning the continuous type of security lighting systems is correct?

1. The system is on 24 hours a day
2. The system is on during the hours of darkness only
3. The system is activated by motion detectors
4. The system is powered by emergency generators only

1-54. Which of the following publications provides the specifications for security lighting?

1. IES Lighting Handbook
2. Navy Physical Security Manual
3. NAVFAC MO-200
4. NAVFAC MO-117

1-55. The power source for security lighting systems should be independent of all other lighting systems.

1. True
2. False

1-56. The switches and controls for security lighting should be located in which of the following areas?

1. Near the main gate
2. Inside the emergency generator room
3. Inside a centrally located guard station
4. Both 2 and 3 above

Assignment 2

Textbook Assignment: "Airfield Lighting." Pages 2-1 through 2-24. "Electrical Load Requirements." Pages 3-1 through 3-10.

Learning Objective: Recognize the various components in an airfield lighting system.

2-1. Airfield lighting configurations on naval bases in the United States and overseas conform to those standards established by

1. the Federal Aviation Administration
2. Air Force regulations
3. the Department of Transportation
4. international agreement

2-2. Which of the following types of airfields is designed to be used by a detachment of KC-130 tanker aircraft?

1. Vertical takeoff and landing (VTOL)
2. Strategic expeditionary landing field (SELF)
3. Both 1 and 2 above
4. Vertical short takeoff and landing (VSTOL)

2-3. Which, if any, of the following components is located in the airfield lighting vault?

1. Lighting control panel
2. Emergency generator
3. Master sequence timer
4. None of the above

2-4. The lighting vault should be located approximately how many feet from the runway to prevent interference with operations?

1. 1,500
2. 2,000
3. 2,500
4. 3,000

2-5. If the control cable leads terminate into actuating coils of the pilot relays, at what maximum number of feet from the lighting vault can the control tower be located?

1. 5,875
2. 7,350
3. 8,250
4. 10,000

2-6. When you are grounding the lighting vault, approximately how many feet apart should you place the ground rods?

1. 5
2. 6
3. 7
4. 8

2-7. What is the primary purpose of the isolation transformer?

1. To maintain constant current in a series circuit
2. To maintain constant current in a parallel circuit
3. To maintain a closed loop in the primary of a series circuit when a lamp failure occurs
4. To maintain a closed loop in the primary of a parallel circuit when a lamp failure occurs

2-8. What voltages are found on the bus bars in the airfield lighting vault?

1. 2,400 volts and 240/120 volts
2. 4,160 volts and 240/120 volts
3. 2,400 volts and 480/240 volts
4. 2,400/4,160 volts and 480/240 volts

2-9. An automatic changeover switch is used to

1. pick up emergency power
2. transfer vault control to the tower
3. turn on the beacon light at dusk
4. shift control to the pilot relays

2-10. Why are constant-current regulators used in an airfield lighting system?

1. To isolate the primary circuit from the runway light
2. To provide constant power to the control tower
3. To prevent short-circuit faults in the runway lights
4. To maintain correct output level, depending on the load

2-11. Which of the following devices are used to obtain a constant-current output in the lighting circuit?

1. Saturable reactors
2. Resonant circuits
3. Moving transformer cores
4. Silicon-controlled rectifiers

2-12. Which of the following devices compensate for voltage drop in an airfield lighting control circuit?

1. Constant-current regulators
2. Transformers
3. Low-burden pilot relays
4. Coaxial cables

2-13. The runway lights may be controlled from two different locations. What device determines which location is used?

1. Transfer-relay cabinet
2. Pilot-relay cabinet
3. Changeover switch
4. Master sequence timer

Learning Objective: Identify the installation and maintenance procedures and safety precautions related to airfield lighting systems.

2-14 What color are runway edge lights?

1. White (clear)
2. Green
3. Red
4. Blue

2-15. Runway edge lights are equally spaced along both sides of the runway at distances not to exceed how many feet?

1. 100
2. 200
3. 300
4. 400

2-16. The minimum loading for airfield lighting constant-current regulators is what percent of the rated kilowatt output?

1. 25
2. 50
3. 75
4. 85

2-17. What color identifies taxiway lights?

1. White (clear)
2. Green
3. Red
4. Blue

2-18. What is the preferred length of an approach lighting system?

1. 500 ft
2. 1,000 ft
3. 1,500 ft
4. 3,000 ft

2-19. The visual approach slope indicator (VASI) lighting system assists the pilot to

1. determine the start of the runway
2. make a ground-controlled approach landing
3. make a visual-glide-slope approach landing
4. determine the length of the runway

2-20. The power for the runway-distance-marker lights should be supplied by

1. the approach lighting circuit
2. the taxiway lighting circuit
3. the threshold lighting circuit
4. a separate series circuit

2-21. The purpose of threshold lights is to mark

1. obstructions at the end of the runway
2. the entrance to the taxiway
3. the overrun area of the runway
4. the beginning and ending of the runway

2-22. What color identifies obstruction lights?

1. White (clear)
2. Green
3. Red
4. Blue

2-23. How many feet apart should obstruction lights be mounted on a 750-foot transmitting tower?

1. 100
2. 150
3. 200
4. 250

2-24. Which of the following descriptions correctly portrays an airport beacon light for a military air station?

1. Red and green
2. Red and white
3. Green and double-peaked white
4. Blue and double-peaked white

2-25. A hazard beacon light mounted on a smokestack flashes how many times per minute?

1. 18
2. 26
3. 45
4. 60

2-26. A beacon light located less than 800 feet from the vault is usually supplied with which of the following power supplies?

1. 80/110 volts
2. 120/24O volts
3. 249/480 volts
4. 2,400 volts

2-27. The 1,000-foot light bar of a strobe light system is also known as the

1. downwind bar
2. upwind bar
3. abort bar
4. decision bar

2-28. The strobe light system may be turned on and off independently or controlled by what light switch?

1. Approach
2. Threshold
3. Runway
4. Taxiway

2-29. A strobe light in a runway lighting system peaks at what candlepower?

1. 3,000
2. 30,000
3. 3,000,000
4. 30,000,000

2-30 What component controls the firing sequence of the strobe lights?

1. Full-wave bridge rectifier
2. 120-volt ac timing signal
3. Autotransformer
4. 22-kilohm resistor

2-31 The purpose of the green light mounted on the strobe light local remote control panel is to indicate that

1. the unit is switched to local control
2. the unit is switched to remote control
3. there is a fault in the system
4. one or more strobe lights have burned out

2-32. The main power transformer in the monitor and control chassis of a strobe system is energized by what power supply?

1. 95-volt dc
2. 120-volt ac
3. 120-volt dc
4. 240-volt ac

2-33. The adjusted resistance of 7,333 ohms in the monitoring circuit of a strobe system is equal to

1. a 22-kilohm resistance at the light unit
2. two 22-kilohm resistors in parallel
3. three 22-kilohm resistors in parallel
4. three 22-kilohm resistors in series-parallel

2-34. To turn off the "lamps out" alarm in the strobe light circuit,

1. move the selector switch to the next position
2. readjust the sensitivity rheostat
3. change the variable resistor
4. change the voltage setting taps on the transformer

2-35. When the master sequence timer is controlling the strobe light system, each contact closes how many times per second?

1. One
2. Two
3. Three
4. Four

2-36. During visual inspections of airfield lighting systems, cables should be checked for

1. cuts and bruises
2. proper size
3. proper length
4. correct location

2-37. During maintenance, molded plug connectors are connected, seated, and then

1. installed
2. checked for moisture
3. taped
4. tested with a hi-pot

2-38. For how many continuous hours should each airfield lighting circuit be operated at maximum brightness during an operational check?

1. 1
2. 2
3. 6
4. 8

2-39. The normal amount of time required for a flash capacitor to bleed down is

1. 5 seconds
2. 10 seconds
3. 1 minute
4. 5 minutes

2-40. The normal radius for an underground cable bend is how many times the cable diameter?

1. 3 to 5
2. 5 to 12
3. 7 to 9
4. 9 to 12

2-41. What danger exists if too many lamps burn out in the secondary of an airfield lighting system?

1. The isolation transformer will overload
2. The remaining lamps will dim
3. The primary current may rise high enough to damage the regulator
4. The excessive voltage could damage the distribution transformer

2-42. If a string of lights in a circuit does NOT light, more than likely, the trouble is

1. an open circuit
2. a short to ground
3. a cross circuit
4. improper power

2-43. The maximum run of ducted cable between manholes is how many feet?

1. 500
2. 600
3. 750
4. 1,000

Learning Objective: Point out the requirements in the installation of a dwelling feeder system.

2-44. The total load of a dwelling unit can be divided into how many categories?

1. One
2. Two
3. Three
4. Four

2-45. The NEC® states that receptacles rated 20 amperes or less may be calculated with what load category?

1. Laundry load
2. Small appliance load
3. Special appliance load
4. General lighting load

2-46. The general lighting load for a 35-foot by 60-foot single dwelling is how many volt-amperes (VA)?

1. 2,100
2. 4,200
3. 5,500
4. 6,300

2-47. How many 20-ampere branch circuits must be installed in the kitchen, pantry, breakfast room, and dining room only?

1. One
2. Two
3. Three
4. Four

2-48. The laundry branch circuit in a dwelling should usually serve at least one additional receptacle besides the laundry receptacle.

1. True
2. False

2-49. Which, if any, of the following appliances may be supplied by the general lighting circuits?

1. Garbage disposal
2. Dishwasher
3. Air conditioner
4. None of the above

2-50. Determine the general lighting and receptacle load for a dwelling that has a 6,300-VA lighting load, two 1,500-VA appliance circuits, and one 1,500-VA laundry circuit.

1. 3,000 VA
2. 4,250 VA
3. 5,730 VA
4. 7,800 VA

2-51. Which of the following demand factors may be applied if there are four or more fixed appliances on a branch circuit?

1. 66 percent
2. 75 percent
3. 80 percent
4. 100 percent

2-52. What is the demand load, in kilowatts, for one clothes dryer rated at 5 kilowatts?

1. 4.5
2. 5.0
3. 6.0
4. 7.5

2-53. What is the demand load, in kilowatts, for a 12-kilowatt household electric range?

1. 8
2. 8 3/4
3. 9 1/2
4. 12

2-54. Which of the following demand factors should you use when you determine the branch circuit conductor size for heating equipment?

1. 75 percent
2. 100 percent
3. 125 percent
4. 150 percent

2-55. All motor loads are classified as

1. intermittent duty
2. heavy duty
3. noncontinuous duty
4. continuous duty

IN ANSWERING QUESTIONS 2-56 THROUGH 2-62, REFER TO THE APPROPRIATE DEMAND TABLES IN CHAPTER 3 OF THE TEXT AND USE THE FOLLOWING INFORMATION:

A certain 2,100-sq-ft dwelling has two small appliance circuits and one laundry circuit with the following special appliance circuits:

One 9 -kVA range
One 1.5-kVA dishwasher
One 5.5-kVA water heater
One 15 -kVA central heater

2-56. What is the minimum size branch circuit required to supply the electric range?

1. 35 amperes
2. 40 amperes
3. 50 amperes
4. 60 amperes

2-57. What is the minimum size branch circuit required to supply the water heater?

1. 25 amperes
2. 30 amperes
3. 35 amperes
4. 40 amperes

2-58. What is the minimum size branch circuit required to supply the central heater?

1. 60 amperes
2. 70 amperes
3. 80 amperes
4. 90 amperes

2-59. The most important point to remember when determining the size of the service-entrance conductors is to

1. size the conductors one size larger than necessary to allow for expansion
2. size the conductors two sizes larger than necessary to allow for expansion
3. ensure that the conductors are large enough to carry the load
4. ensure that the conductors are large enough to carry 80 percent of the total demand

2-60. A service-entrance conductor for a single-family dwelling with six or more two-wire circuits is required to have a three-wire service and a minimum of how many amperes?

1. 60
2. 100
3. 125
4. 200

2-61. If phase A on a 240-volt, single-phase-system carries a 60-ampere, 120-volt load, and phase B carries an 80-ampere 120-volt load, what maximum current (in amperes) is the neutral conductor required to carry?

1. 20
2. 60
3. 80
4. 140

2-62. When computing the size of the neutral conductor, you can omit all single-phase and three-phase 240-volt loads except feeders supplying which of the following appliances?

1. Electric ranges
2. Water heaters
3. Central heaters
4. Air conditioners

Assignment 3

Textbook Assignment: "Electrical Load Requirements." Pages 3-10 through 3-15.
"Solid-State Devices and Circuits." Pages 4-1 through 4-32.

Learning Objective: Identify the requirements in the installation of an industrial feeder systems.

3-1. A load is considered continuous duty if the appliance or motor operates a minimum of how many continuous hours?

1. 6
2. 2
3. 3
4. 8

3-2. Receptacle loads may be included in the lighting load calculations for industrial areas.

1. True
2. False

3-3. Any lighting loads identified as continuous duty must be computed at what percentage of the total connected load?

1. 75 percent
2. 100 percent
3. 125 percent
4. 150 percent

3-4. What is the load for 20 feet of multi-outlet assemblies serving light, noncontinuous loads?

1. 720 VA
2. 900 VA
3. 1,800 VA
4. 3,600 VA

3-5. What is the total connected load for 16 receptacles servicing loads used 8 hours each day?

1. 2,355 VA
2. 2,880 VA
3. 3,600 VA
4. 4,200 VA

3-6. If the conductors are supplying a group of motors, the correct procedure for calculating conductor size is to compute

1. the full-load current rating of the largest motor plus 125 percent of the sum of the full-load current rating of the remaining motors
2. the sum of the full-load current rating of the two largest motors plus the sum of the full-load current rating of the remaining motors
3. the sum of the full-load current rating of all of the motors only
4. 125 percent of the full-load current rating of the largest motor plus the sum of the full-load current rating of the remaining motors

3-7. The total voltage drop of a combination feeder/branch circuit should not exceed what maximum percentage?

1. 5 percent
2. 2 percent
3. 3 percent
4. 6 percent

3-8. If the voltage drop in a circuit exceeds the prescribed limits, what corrective action can be taken?

1. The supply voltage can be increased
2. A larger size conductor can be installed
3. The circuit length can be shortened
4. Either 2 or 3 above, whichever seems more feasible

Learning Objective: Recognize the function, operation, and installation of ground fault interrupter (GFI) circuit breakers.

3-9. A ground fault interrupter (GFI) operates on the principle of an imbalance of current between the line conductor and

1. another line conductor
2. the grounding conductor
3. the grounding electrode conductor
4. the neutral conductor

3-10. Which, if any, of the following receptacles is required to be protected by a GFI circuit breaker or GFI receptacle?

1. Receptacle supplying a gas dryer
2. Receptacle installed in a bathroom
3. Receptacle supplying a garage door opener
4. None of the above

Learning Objective: Identify restrictions placed on electrical systems installed in hazardous locations.

3-11. Locations where flammable gases or vapors are normally present in the air are designated as

1. Class I, Division 1
2. Class I, Division 2
3. Class II, Division 1
4. Class III, Division 2

3-12. 4 flammable storage locker is considered a

1. Class I, Division 1 location
2. Class I, Division 2 location
3. Class II, Division 1 location
4. Class II, Division 2 location

3-13. For general wiring in a Class I, division 1 location, the NEC® permits the use of which of the following types of conduit?

1. Rigid metallic conduit
2. Rigid nonmetallic conduit
3. Electrical metallic tubing
4. All of the above

3-14. When installing flexible connections to motors located in Class II, Division 1 locations, you may use which of the following types of materials?

1. Flexible metal conduit
2. Hard usage cord
3. Type AC armored cable
4. Liquid-tight flexible metal conduit

3-15. If a conduit is run through an enclosure containing spark-producing devices, a conduit seal has to be installed no farther from the enclosure than a maximum of how many inches?

1. 12
2. 18
3. 24
4. 30

3-16. What grounding techniques are used in hazardous locations?

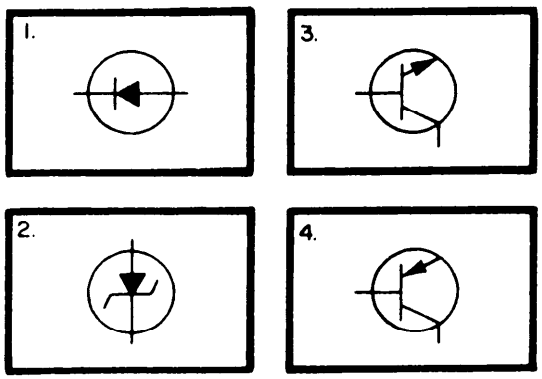
1. Double locknuts only
2. Locknut and bushing only
3. Bonding jumpers
4. Double locknuts and bushing

Learning Objective: Identify semiconductors used in electronic circuits.

3-17. Select the purpose(s) of the rectifier diode.

1. To amplify only
2. To rectify only
3. To rectify and amplify
4. To switch

3-18. Which of the following is the schematic symbol of the rectifier diode?



3-19. What is the total number of connections in a zener diode?

1. One
2. Two
3. Three
4. Four

3-20. What is the purpose of the zener diode in an electronic voltage regulator?

1. To provide voltage reference
2. To regulate output voltage
3. To provide frequency reference
4. To compensate for low supply voltage

3-21. An SCR operates much like an ordinary rectifier diode except that it

1. conducts current in only one direction
2. requires reverse bias to operate
3. has a lower breakdown voltage
4. must be fired to conduct

3-22. An SCR is turned on by a positive pulse of current applied to the gate lead. What action turns off the SCR?

1. Removing the positive pulse from the gate lead
2. Inserting a positive pulse on the gate lead
3. Reversing the current of the main power supply
4. Increasing the current of the main power supply until the SCR saturates

3-23. Transistors are used to amplify all of the following factors EXCEPT

1. resistance
2. current
3. voltage
4. power

3-24. What are the three elements of a transistor?

1. Emitter, collector, and base
2. Anode, base, and collector
3. Cathode, base, and collector
4. Collector, emitter, and cathode

3-25. How, if at all, does the uni junction transistor (UJT) differ from a conventional transistor?

1. The UJT has two collectors
2. The UJT has a second base instead of a collector
3. The UJT has a second emitter instead of a collector
4. There is no difference

3-26. The UJT has which of the following advantages over the transistor?

1. Fewer terminals
2. Larger bandpass
3. Less bias requirement
4. Increased temperature stability

3-27. A device that combines both active and passive components of a complete circuit in a single chip is called

1. microelectronics
2. an integrated circuit
3. a printed circuit board
4. an integrated circuit board

Learning Objective: Point out the applications of solid-state components used in NCF equipment.

3-28. The primary function of the rectifier section of a power supply is to

1. increase average voltage output
2. decrease average voltage output
3. convert dc to ac
4. convert ac to dc

3-29. A bridge rectifier circuit can be easily identified because it contains

1. a transformer and four diodes
2. two diodes with a cross resistor
3. three diodes
4. a center-tapped transformer

3-30. Which of the following conditions would exist if one diode in a bridge rectifier circuit failed?

1. No output voltage
2. No change in output voltage
3. Half-wave rectifier output voltage
4. Full-wave rectifier output voltage

3-31. The error signal applied to the error amplifier circuit of an SCR voltage regulator consists of the difference between the rectified generator output and a voltage developed across the

1. generator field
2. stabilizing circuit
3. voltage-adjust rheostat
4. zener diode

3-32. In an SCR voltage regulator, what is the function of the error amplifier?

1. To provide the regulator with proper voltage
2. To provide phase angle control for firing the SCRs
3. To sense output voltage
4. To sense deviation in generator voltage

3-33. The value of current supplied to the exciter field depends upon the

1. resistance-capacitance (RC) network
2. series-boost circuit
3. conduction time of the SCRs
4. capacitance of the exciter field

3-34. Which circuit of the SCR voltage regulator prevents over-correction for a change in generator voltage?

1. Power input circuit
2. Sensing circuit
3. Stability circuit
4. Error detector circuit

3-35. What is the purpose of the K1 relay in an SCR voltage regulator?

1. To control exciter field current
2. To prevent buildup of exciter field voltage
3. To provide a current path to the SCRs
4. To provide automatic voltage buildup

3-36. The parallel compensation circuit of an SCR voltage regulator allows the paralleled generator to

1. establish the grid frequency
2. establish the grid voltage
3. share the reactive load
4. share the resistive load

3-37. The reactive differential compensation circuit can be used only when all the generators connected in parallel have identical paralleling circuits included in the loop.

1. True
2. False

3-38. Field current regulation in a transistor voltage regulator is accomplished by using

1. an SCR
2. a saturable core transformer
3. high-voltage diodes
4. a series current resistor

3-39. Power for the saturable core transformer is obtained from the

1. sensing transformer
2. power output transistors
3. current transformers
4. linear reactor

3-40. The purpose of the amplifier circuit in a transistor voltage regulator is to

1. provide current to the exciter field
2. amplify the reference voltage
3. detect deviation in generator voltage
4. control exciter field current

3-41. The actual generator output voltage is determined by the

1. zener-diode bridge
2. operator's voltage-adjust rheostat
3. vector-summing circuit
4. voltage-feedback rheostat

3-42. The initial field current for exciting the generator is provided by a field-flashing circuit from the

1. static exciter
2. output rectifiers
3. saturable core transformer
4. battery bank

IN ANSWERING QUESTIONS 3-43 THROUGH 3-47, SELECT FROM COLUMN B THE FUNCTION OF THE PROTECTIVE RELAY LISTED IN COLUMN A. RESPONSES IN COLUMN B MAY BE USED MORE THAN ONCE.

A. PROTECTIVE RELAYS	B. FUNCTIONS
3-43. Overvoltage	1. Protect the load
3-44. Undervoltage	2. Protect the generator
3-45. Underfrequency	
3-46. Reverse-power	
3-47. Overload	

3-48. An undervoltage relay will operate when the generator voltage decreases to approximately what percentage of rated output voltage?

1. 65
2. 75
3. 85
4. 95

3-49. When the load of a generator exceeds 130 percent of the rated current, which of the following events occur(s)?

1. Engine secures
2. Annunciator alarms
3. Generator breaker opens
4. Both 2 and 3 above

Learning Objective: Recognize proper techniques for trouble-shooting electronic devices and circuits.

3-50. Compared to the vacuum tube, the solid-state device has which of the following limitations?

1. More sensitive to temperature
2. Use limited to radar equipment
3. Difficult to adapt to commercial products
4. Each of the above

3-51. To check transistors, you should avoid using an ohmmeter that is capable of providing a current of more than

1. 0.1 milliampere
2. 1.0 milliampere
3. 10.0 milliamperes
4. 1.0 ampere

3-52. Which of the following tests is a convenient method of checking a rectifier diode?

1. The substitution of a new diode for the questionable one
2. A dynamic electrical check with a diode test set
3. A forward and reverse resistance check with an ohmmeter
4. A forward and reverse resistance check, using two different ohmmeters

3-53. When testing a zener diode, you should use a variable dc power supply to

1. limit current through the zener diode
2. supply enough current to cause the zener diode to conduct
3. supply enough voltage to cause the zener diode to conduct
4. isolate the zener diode from chassis ground

3-54. Which, if any, of the following actions would cause an SCR to conduct when it is tested with an ohmmeter?

1. Shorting the anode to the cathode
2. Shorting the anode to the gate
3. Shorting the cathode to the gate
4. None of the above

3-55. A high resistance reading across base 1 and base 2 of a uni junction transistor indicates that the transistor is

1. open
2. shorted
3. grounded
4. good

3-56. Of all the tests used in troubleshooting transistors, which two are the most important?

1. Gain and leakage
2. Gain and breakdown
3. Breakdown and switching
4. Leakage and breakdown

3-57. Which of the following conditions would cause a transistor to test bad in the circuit but good when removed from the circuit?

1. A low-impedance shunt path around the transistor
2. A fault in the circuit
3. Excess leakage in the transistor
4. All of the above

3-58. Although not specifically designed for it, the transistor tester will test SCRs for which of the following conditions?

1. Breakdown and leakage
2. Switching and leakage
3. Switching and breakdown
4. All of the above

3-59. When the transistor tester is being used, if an SCR is shorted, both positions of the test will indicate

1. low leakage
2. high leakage
3. low resistance
4. high resistance

3-60. A device that can be of great value in troubleshooting integrated circuits (ICs) is the

1. ohmmeter
2. transistor tester
3. logic probe
4. oscilloscope

3-61. What is the principal use of the cathode-ray tube oscilloscope?

1. Analysis of voltage waveforms
2. Analysis of Current waveforms
3. Measurement of frequency of rotating machines
4. Measurement of microwave energy

3-62. In a dual-trace oscilloscope the horizontal axis represents amplitude in volts, and the vertical axis represents time in seconds.

1. True
2. False

3-63. The oscilloscope test probe should be calibrated before each use to

1. reduce high capacitance in RC circuits
2. block frequency signals above 500 MHz
3. reduce high inductance in RL circuits
4. prevent waveform distortion

3-64. It is always necessary to ground each test probe to prevent interference or other waveform distortion on high-frequency signals.

1. True
2. False

3-65. To analyze an electronic circuit effectively with an oscilloscope, you must first determine the correct

1. voltage requirements for each component
2. current requirements for each component
3. waveform by consulting the manufacturer's literature
4. waveform by comparison with similar equipment

3-66. Capacitor failures are commonly caused by which of the following conditions?

1. Excessive dielectric leakage
2. An increase in dielectric absorption
3. Change in capacity value
4. Each of the above

3-67. A puncture in the dielectric material of a capacitor is usually caused by

1. high-voltage spikes
2. long shelf life
3. low-voltage operation
4. parallel operation

3-68. Dielectric absorption is the inability of a capacitor to do what action?

1. Fully charge to rated voltage
2. Completely discharge to zero
3. Operate at high frequencies
4. Maintain the correct voltage requirements

3-69. Electrolytic capacitors that indicate low value or high leakage because of long shelf life may be salvaged by

1. operating the capacitor at one-half the rated voltage
2. operating the capacitor at twice the rated voltage
3. heating the capacitor in an oven for 1 hour
4. reforming the capacitor with a capacitor tester

3-70. Which of the following is NOT a cause of inductor coil failure?

1. Shorted coil turns
2. Open coil turns
3. Low power factor
4. Changes in inductor value

3-71. If you perform the ringing test on an inductor coil and the results are some, but less than 10, ringing cycles, the coil is

1. open
2. grounded
3. shorted
4. the wrong value

Assignment 4

Textbook Assignment: "Power Generation and Distribution." Pages 5-1 through 5-34.

Learning Objective: Identify the procedures for calculating generator load and the fundamentals of selecting units by size and type.

4-1. A power distribution system consists of the

1. generators and powerhouse
2. equipment between the generators and the customer's service entrance
3. equipment between the primary mains and the power load
4. high-voltage transmission lines

4-2. The annual load factor of an advanced base is found by dividing the

1. load demand by the diversity factor
2. demand factor by the peak power
3. true power by the apparent power
4. average power by the peak power

4-3. Which of the following percentage pairs represents acceptable values of the annual load factor and power factor of an advanced base?

1. 40 percent, 95 percent
2. 45 percent, 95 percent
3. 50 percent, 80 percent
4. 60 percent, 75 percent

4-4. Which of the following generating requirements for communications and lighting can be met with a S-kilowatt gasoline-driven generator?

1. 120 volts, single-phase, 60 hertz
2. 120/208 volts, single-phase, 60 hertz
3. 120/208 volts, three-phase, 60 hertz
4. All of the above

4-5. The demand factor for a group of loads is determined by dividing the

1. actual maximum demand by the total connected load
2. average power demand by the peak power demand
3. average power demand by the true power demand
4. actual load demand by the annual load factor

4-6. The total connected load for your repair shop is 60 kilowatts, and the maximum demand is 40 kilowatts. What is the demand factor?

1. 26 percent
2. 50 percent
3. 66 percent
4. 75 percent

Learning Objective: Apply the principles of directing personnel in the selection and installation of generators.

4-7. A generator supplying power for an advanced base should be located near the

1. barracks site
2. edge of the base
3. points of small demand
4. points of large demand

4-8. One way to get rid of excess engine heat in and around a generator set that is installed inside a building is by

1. providing suitable exits for exhaust gases
2. opening all the doors and hatches on the generator set
3. providing large louvered openings in the side of the generator set
4. providing large louvered openings in the building walls at the front and back of the generator set

4-9. What is the best way to get rid of carbon monoxide gas that is manufactured by a diesel-engine generator?

1. Extend the engine's exhaust pipe to the outside of the building
2. Cool the gas in a cold-water bath before it goes to the exhaust
3. Provide fresh air ducts in the roof of the generator building
4. Open all doors and hatches on the generator set

4-10. Afer the generator set is installed, the next step you or your crew should do is to

1. test-operate the unit to check voltage and frequency
2. place the unit under 110 percent load for 2 hours
3. conduct a visual overall inspection
4. place the generator in operation

4-11. You can shorten the warming-up period for a large generator by

1. opening and latching the fan cover
2. closing the bypass shutters and doors
3. covering the engine exhaust stacks
4. closing the roof hatches and side louvers

4-12. The installation resistance of the stator and rotor windings of a 120/208-volt generator should be checked with a megohm meter before operation, but the test voltage should not exceed

1. 250 volts dc
2. 250 volts ac
3. 500 volts dc
4. 500 volts ac

4-13. When the manufacturer's instructions are not available, brushes for integral horsepower and integral kilowatt machines are to be set with a brush pressure of

1. 1.0 to 2.0 psi
2. 2.0 to 2.5 psi
3. 3.0 to 3.5 psi
4. 4.0 to 4.5 psi

4-14. The changeover board on an advanced-base generator is used as a means of

1. disconnecting the generator leads from the potential transformers
2. disconnecting the generator leads from the current transformers
3. rearranging the generator leads to change phase rotation
4. rearranging the internal alternator leads to give a specified output voltage

4-15. The grounding electrode for a generator set should have a resistance-to-ground reading of no more than how many ohms?

1. 10
2. 25
3. 50
4. 75

4-16. Generator load cables that are placed underground (direct burial) must be of a type known as

1. RHW (heat and moisture resistant)
2. TW (thermoplastic-insulated)
3. WP (waterproof)
4. R (rubber-insulated, rubber-jacketed)

Learning Objective: Recognize the procedures to follow in operating and maintaining an advanced-base generator plant.

4-17. The purpose of keeping a generator station log is to

1. help determine when a particular piece of equipment needs preventive maintenance
2. record the fuel consumption of all generators
3. provide a history of current demands by all customers
4. record the automatic operations of the fuel transfer pump

4-18. The procedure that assures that all systems and controls are properly aligned for operation is found in the

1. prestart checklist
2. operator maintenance manual
3. intermediate maintenance manual
4. shutdown checklist

4-19. Before two generators can be operated in parallel, they must be brought into synchronism. When they are in synchronism, which of the following conditions must exist?

1. The terminal voltages must be equal
2. The frequencies must be equal
3. The voltage sequences must be in phase
4. All of the above

4-20. One of the primary considerations in paralleling generator sets is achieving the proper division of load. What characteristic of the generator set accomplishes this division of load?

1. Voltage regulator sensitivity
2. Voltage regulator range
3. Governor speed droop
4. Governor load limit

4-21. Of three generators operating in parallel, how many are set at zero on the speed droop dial?

1. One
2. Two
3. Three
4. Four

4-22. The frequency of the slave machine should be slightly higher than that of the master machine when the circuit breaker is closed to ensure that the

1. slave machine assumes a small amount of load
2. slave machine assumes a large amount of load
3. master machine assumes a small amount of load
4. master machine assumes a large amount of load

4-23. If the synchronizing lights blink on simultaneously and off simultaneously, which of the following conditions exist(s)?

1. The frequencies are equal
2. The voltages are equal
3. The voltage sequences are in phase
4. All of the above

4-24. If you notice that the synchronizing lights are blinking on and off alternately, what action should you take?

1. Ad just the speed of the incoming generator
2. Adjust the speed of the on-line generator
3. Adjust the voltage of the incoming generator
4. Interchange any two load cables of the incoming generator

4-25. When you are paralleling by using the synchronizing lights, when should you close the circuit breaker to place the incoming generator on the line?

1. At the instant both lights go out
2. At the instant both lights go on
3. While both lights are out
4. While both lights are on

4-26. The power factor of an electrical load is determined by dividing the

1. true power by the peak power
2. true power by the apparent power
3. apparent power by the peak power
4. peak power by the average power

4-27. Capacitors may be used to improve the power factor of a system when the reduced power factor has been caused by the effects of which of the following components?

1. Lagging reactive
2. Leading reactive
3. Purely resistive
4. Each of the above

4-28. You can divide the reactive load between two generators by adjusting the

1. speed of the generators
2. voltage of the generators
3. speed droop of the governors
4. capacitance-reactance of the voltage regulators

4-29. What is the purpose of installing both a mechanical clock and an electric clock at a power plant?

1. To ensure correct generator output frequency
2. To compensate for power failures
3. To ensure correct generator output voltage
4. To indicate improper division of reactive load

4-30. All of the following maintenance checks are performed by the operator EXCEPT

1. checking the level of the coolant
2. greasing the fuel transfer pump
3. draining water from the fuel tank
4. adding oil to the crankcase

Learning Objective: Identify components and types of distribution systems and point out advantages and disadvantages of each.

4-31. For which of the following reasons is an overhead distribution system preferred over an underground system?

1. It is not affected by climate
2. It can accommodate larger conductors
3. It uses lower primary voltages
4. It offers greater flexibility to changing conditions

4-32. In the loop distribution system, how many breakers are installed near the distribution transformers to open each primary cable?

1. One
2. Two
3. Three
4. Four

4-33. A network system and a radial system differ with respect to the

1. type of transformers used
2. type of fuses used
3. way the secondaries are connected
4. way the primaries are connected

4-34. If a new primary feeder system must be flexible because of probable future growth, what type of system should you recommend?

1. Network
2. Radial
3. Loop
4. Each of the above

4-35. The voltage at the distribution center can be maintained practically constant by installing a feeder voltage regulator at the

1. distribution center
2. substation
3. generating station
4. distribution transformer

4-36. The fused cutouts located between the primary mains and the transformer protect the transformer against which of the following occurrences?

1. High-voltage surges
2. Short circuits
3. Overloads
4. Both 2 and 3 above

Learning Objective: Recognize factors used in implementing a transformer installation.

4-37. Lightning arresters for a distribution transformer should be located between the

1. primary mains and fused cutouts
2. primary and secondary sides of the transformer
3. fused cutouts and the secondary bushings of the transformer
4. secondary side of the transformer and the service drop

4-38. Which of the following types of distribution transformers require(s) the installation of external protective devices?

1. Conventional
2. Self-protected
3. Both 1 and 2 above
4. Completely self-protected

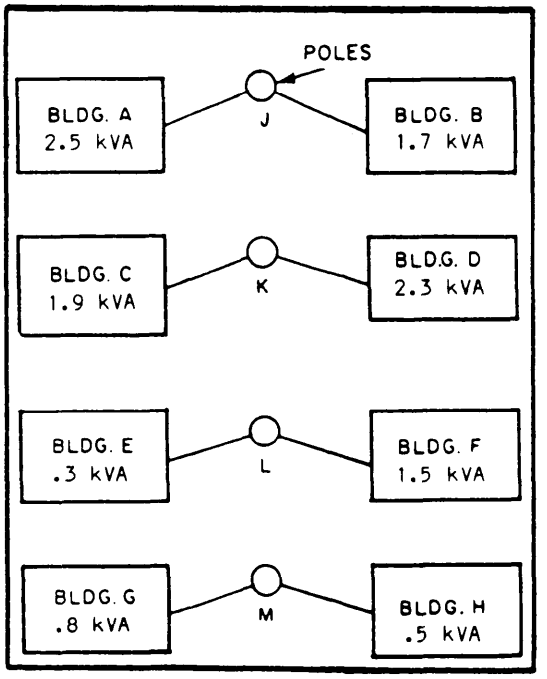


Figure 4A

IN ANSWERING QUESTIONS 4-39 THROUGH 4-41, REFER TO THE TRANSFORMER INSTALLATION REPRESENTATION IN FIGURE 4A.

4-39. What is the maximum demand based on a 0.9 demand factor?

1. 5.6 kVA
2. 6.9 kVA
3. 10.4 kVA
4. 11.5 kVA

4-40. What is the minimum size of transformer needed to supply the average demand?

1. 10 kVA
2. 15 kVA
3. 25 kVA
4. 37.5 kVA

4-41. The most suitable location for the transformer is at pole

1. J
2. K
3. L
4. M

4-42. Transformers larger than 100 kVA are usually mounted on a

1. pad or platform
2. pole below the secondary mains
3. pole above the secondary mains
4. cluster mount above the primary mains

Learning Objective: Recognize the steps required to select the size and type of guy wire and anchor correctly.

4-43. A correctly installed guy protects the pole line from damage caused by

1. improperly sagged line conductors
2. large transformer banks
3. the strain of the line conductors

4-44. What effect, if any, will any change in direction of the transmission line have on line conductor tension?

1. Increase the tension
2. Decrease the tension
3. Double the tension
4. None

4-45. Which of the following lead-to-height guy ratios is preferred to reduce stresses on the pole?

1. .75 to 1.0
2. 1.0 to 1.0
3. 1.0 to 1.5
4. 1.5 to 1.0

4-46. The holding power of an anchor depends upon which of the following conditions?

1. The area of the anchor plate
2. The depth setting
3. The type of soil
4. All of the above

Learning Objective: Identify the components and requirements needed to provide protection on a power distribution system.

4-47. Lightning arresters protect the primary lines from

1. overcurrent surges
2. undervoltage conditions
3. overvoltage caused by lightning
4. low power factor conditions

4-48. When installing a single-phase, 100-kVA transformer with an operating voltage of 2,400 volts, what size of fuse link do you need?

1. 50
2. 65
3. 100
4. 150

4-49. When installing a three-phase, 150-kVA transformer bank with an operating voltage of 12,000 volts, what size of fuse link do you need?

1. 10
2. 15
3. 20
4. 40

4-50. In a three-phase installation, where is the wire from the top of each lightning arrester attached?

1. To the secondary line
2. To the transformer housing
3. To the primary line
4. To the main ground wire

4-51. Where is the ground wire on an overhead distribution line normally mounted?

1. Below the primary lines
2. Below the secondary lines
3. Alongside the neutral wire
4. Above the primary lines

4-52. Which of the following actions will improve the power factor of a power distribution system with lagging currents?

1. Installing a capacitor bank
2. Increasing the size of the primary conductors
3. Placing a resistive load in parallel with a reactive load
4. All of the above

4-53. You can protect primary feeder capacitor banks from lightning damage by installing

1. lightning rods
2. ground rods
3. high-voltage fused cutouts
4. lightning arresters of the line type

4-54. At what point in a power distribution system should you install a capacitor bank for added load capacity?

1. Transformer bank
2. Load center
3. Substation
4. Generating station

4-55. Before short-circuiting the terminals of a capacitor after it has been de-energized, you should wait a minimum of how many minutes?

1. 5
2. 10
3. 15
4. 30

4-56. Facilities are found in what area of the NAVFAC P-437?

1. Part 1 of Volume I
2. Part 2 of Volume I
3. Part 1 of Volume II
4. Part 2 of Volume II

4-57. Components are defined as a grouping of

1. equipment and materials that has no specific function or mission
2. personnel and equipment that has a specific function or mission
3. personnel and materials that has a specific function or mission
4. personnel and materials that has no specific function or mission

Assignment 5

Textbook Assignment: "Field Riggings and Hoisting Systems." Pages 6-1 through 6-18.

Learning Objective: Recognize principles of designing and erecting simple hoisting devices.

5-1. Field-erected hoisting devices basically consist of a block-and-tackle system arranged on some form of skeleton structure consisting of wooden poles or steel beams.

1. True
2. False

5-2. When natural holdfasts of sufficient strength are NOT available, which of the following devices can be used?

1. Log deadman only
2. Combination-log-picket holdfast only
3. Combination-picket holdfast only
4. Any man-made holdfast

5-3. When using trees as holdfasts, you should always attach the guys near

1. a sturdy branch to avoid slipping
2. the center of the trunk of a tree
3. ground level

5-4. After a guy line to a picket holdfast is tightened, what means should be used to secure the guy line?

1. A clove hitch
2. Two clove hitches
3. A half hitch
4. Two half hitches

5-5. The simplest type of holdfast that is suitable for an anchor guy and that can bear loads up to 4,000 pounds is a 3-2-l combination picket.

1. True
2. False

5-6. Suppose a picket holdfast will be used for several days. What should the guys be made of?

1. Small stuff
2. Galvanized wire
3. Both 1 and 2 above

5-7. Which of the following is the best description of the combination-log picket?

1. The guy is connected to the center of a log buried in the ground
2. The guy is connected to the center of a log lashed to the trunks of two trees
3. The guy is anchored to a log or timber supported against four or six combination-picket holdfasts

5-8. How should the holes for a rock holdfast be drilled?

1. 1 to 2 feet deep and straight up and down
2. 1 1/2 to 3 feet deep and at a slight angle away from the direction of pull
3. 1 1/2 to 3 feet deep and at a slight angle towards the direction of pull

5-9. When a steel-picket holdfast is being used, there is an advantage to using two or more units in combination.

1. True
2. False

5-10. Determine the maximum height of at timber gin pole that has an 8-inch diameter.

1. 10 feet
2. 28 feet
3. 48 feet
4. 50 feet

5-11 Determine the minimum distance from the base of the gin pole to the anchorage of the guy lines for a 15-foot gin pole.

1. 15 feet
2. 30 feet
3. 45 feet
4. 60 feet

5-12 What part of a gin pole assembly is most likely to be the weakest point?

1. Load line
2. Fall line
3. Holdfast
4. After guy line

5-13. To have the LEAST amount of stress on the guys, you should have the gin pole in what position?

1. Almost horizontal
2. Vertical
3. At a 45° angle

5-14 When rigging a gin pole, you should use a square knot to

1. hang the guys on the pole
2. tie the guys to the holdfasts
3. tie the forward guys to the back guys
4. secure the ends of the lashings

5-15 When laying out the guy line on the ground before the erection of a 12-foot pole, you should make them how many feet long?

1. 12
2. 24
3. 48
4. 72

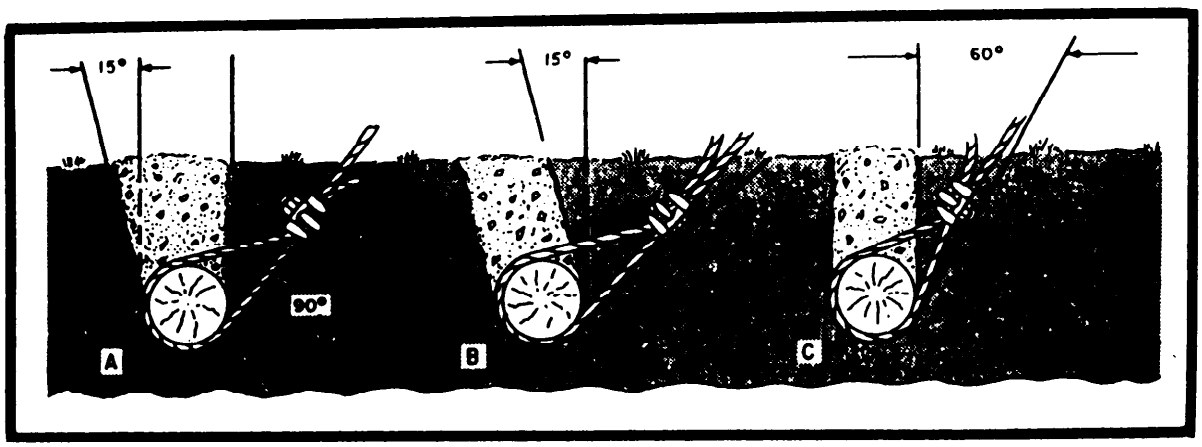


Figure 5A

IN ANSWERING QUESTIONS 5-16 AND 5-17, REFER TO FIGURE 5A.

5-16. When preparing to use a deadman as an anchor for a guy, you should begin by making an excavation similar to the one shown at

1. A
2. B
3. C

5-17. A deadman should be buried and the guy wrapped around it as shown at

1. A only
2. B only
3. C only
4. Either A, B, or C, whichever is preferred

5-18. To keep a gin pole from skidding while being erected, what should you do?

1. Reeve tackle to the rear of the pole and attach it to a stationary object
2. Have part of the erection crew tie it off at the base of the pole and pull forward while the rest of the crew raises the pole from the rear
3. Set up a picket holdfast about 3 feet forward of the pole base and tie it off at the base of the pole

5-19. Gin poles of 50 feet or less can be easily handled by hand.

1. True
2. False

5-20. To erect a gin pole properly, you should have a crew consisting of how many members?

1. 10 or more
2. 6 to 9
3. 3 to 5

5-21. The hole for the base of the gin pole should be how deep?

1. 6 to 12 inches
2. 16 to 18 inches
3. 20 to 24 inches

5-22. When raising the gin pole, what can you do to get the block in reach?

1. Tie a line to the hook of the movable block
2. Overhaul the tackle until it is longer than the pole, and secure it to an anchorage
3. Roth 1 and 2 above

5-23. What is meant by "drifting"?

1. Moving an object left or right
2. Moving the top of the pole 15° without moving the base
3. Hoisting or placing a load

5-24. Besides lifting heavy machinery or bulky objects, shear legs can be used for

1. unloading trucks and flat-cars
2. hoisting over wells, mine shafts, and other excavations
3. supporting ends of a cableway and highline

5-25. As part of the shears' rigging, the after guy should be strong enough to lift how much of the load?

1. One fourth
2. One half
3. Three fourths

5-26. After wrapping the tops of the poles for shear legs with small stuff, you should tighten and secure the lashing by

1. mousing
2. shearing
3. guying
4. frapping

5-27. When preparing to erect a 40-foot shear, how far apart should you dig the holes that will support the legs?

1. 10 feet
2. 16 feet
3. 20 feet
4. 24 feet

5-28. How deep in the ground should holes be dug to keep shear legs from kicking out while in operation?

1. 1 foot
2. 2 feet
3. 1.5 feet
4. 6 inches

5-29. When a load is applied, it is a good practice to lash the butt ends of the shears with chain, line, or boards to keep them from spreading.

1. True
2. False

5-30. Which of the following is an advantage of using the tripod in a hoisting operation?

1. It is stable
2. It requires no guys or anchorage
3. It has a capacity greater than that of shears made of material of the same size
4. Each of the above

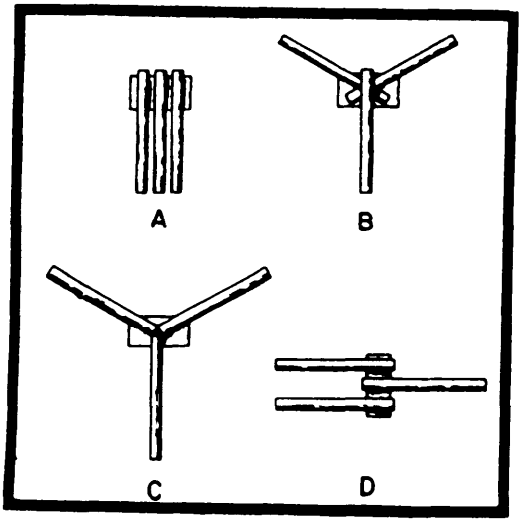


Figure 5B

IN ANSWERING QUESTION 5-31, REFER TO FIGURE 5B.

5-31. When erecting a 35-foot tripod without the aid of mechanized equipment or auxiliary hoists, which arrangement shown in figure 5B should you use for lashing the poles before erection?

1. A
2. B
3. C
4. D

5-32. The proper spread for the legs of a tripod is between one half and two thirds of the length of a leg.

1. True
2. False

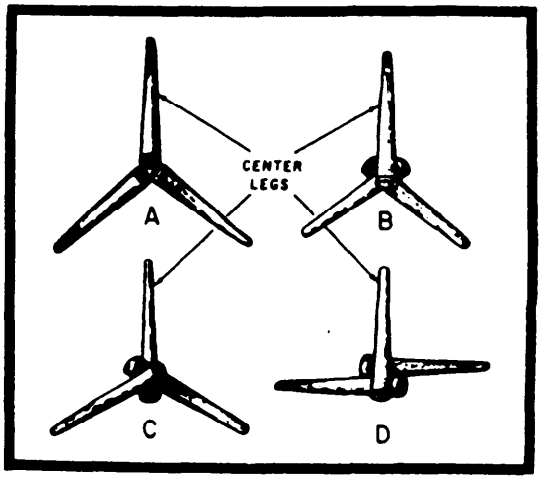


Figure 5C

IN ANSWERING QUESTION 5-33, REFER TO FIGURE 5C.

5-33. As viewed from the top, a properly erected tripod looks like which part of figure SC?

1. A
2. B
3. C
4. D

5-34. If a 20-foot-long boom is needed to provide the desired working radius for a boom derrick, the mast is approximately how many feet long?

1. 20
2. 30
3. 40
4. 60

5-35. When rigging a boom derrick, you should keep the bottom end of the boom from slipping downward on the mast by securing it with

1. cleats
2. the topping lift
3. a sling
4. guys

5-36. What blocks should be attached at the same point on a boom derrick?

1. Fairlead block and fixed tackle block
2. Fixed tackle block and fixed topping lift block
3. Running topping lift block and fairlead block
4. Fixed tackle block and running topping lift block

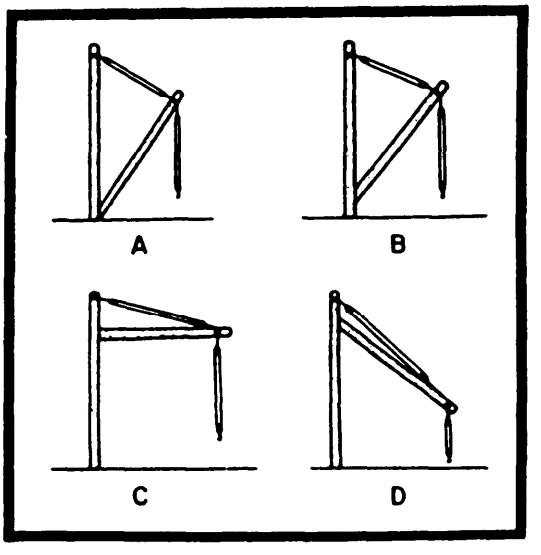


Figure 5D

IN ANSWERING QUESTION 5-37, REFER TO FIGURE 5D.

5-37. The recommended heavy-load position of the boom on a boom derrick is shown in figure 5D at

1. A
2. R
3. C
4. D

5-38. The average person can pull with a force of nearly 100 pounds on a single vertical line. The same person can pull on a single horizontal line with a force of how many pounds?

1. 30
2. 60
3. 90
4. 120

5-39. Which of the following is an advantage in using a chain hoist over other devices?

1. Loads can remain stationary without requiring attention
2. Loads can be handled cautiously
3. Heights can be adjusted accurately
4. Each of the above

IN ANSWERING QUESTIONS 5-40 THROUGH 5-42, SELECT FROM COLUMN B THE HOIST BEST SUITED FOR THE OPERATION IN COLUMN A. RESPONSES IN COLUMN B MAY BE USED ONCE, MORE THAN ONCE, OR NOT AT ALL.

A. OPERATIONS	B. HOISTS
5-40. Lifting ordinary loads frequently	1. Differential chain hoist
5-41. Lifting light loads occasionally	2. Ratchet-handle pull hoist (come-along)
5-42. Pulling heavy objects horizontally over short distances	3. Spur gear hoist

---

5-43. What part of a chain hoist assembly is intentionally manufactured to be the weakest part?

1. Spur gear assembly
2. Chain lock assembly
3. Upper hook
4. Lower hook

5-44. The hooks or links of a chain hoist that show signs of spreading or excessive wear should be replaced before the hoist is used again.

1. True
2. False

5-45. After erecting a pole derrick for a lifting job, where should you install a hand-operated winch?

1. At least one pole length behind the derrick
2. To the right of the pole using a snatch block and fairlead
3. On either side of the knee braces
4. Near the foot of the derrick

5-46. Suppose a power-driven winch is set up so that the hoisting line leaves the drum at an angle upward from the ground. Which of the following actions should you take to avoid lifting the winch clear of the ground?

1. Increase the size of the winch
2. Move the load slowly
3. Place a leading block in the system to change the direction of pull
4. All of the above

5-47. As a hoisting line is being wound on a drum, you must make sure that the fleet angle does NOT exceed a maximum of how many degrees?

1. 6
2. 2
3. 8
4. 4

5-48. The lifting capacity of a crane is dependent upon the

1. diameter of the winch
2. size of the fleet angle
3. size of the lifting hook
4. boom length and angle

5-49. Which of the following factors is used to designate the size of small stuff?

1. Diameter
2. Circumference
3. Number of strands
4. Number of threads per strand

5-50. The largest size manila line ordinarily carried in stock is how many inches?

1. 8
2. 2
3. 12
4. 16

5-51. Which of the following formulas can be used to find the approximate breaking strength (BS) of manila line?

1. $BS = c^2 \times 900$
2. $BS = C^2 \times 2400$
3. $BS = D^2 \times 900$
4. $BS = D^2 \times 2400$

5-52. A wide margin between the safe working load (SWL) and the breaking strength of fiber line is desirable for what reason?

1. To allow for the strain imposed only by jerky movements
2. To allow for the strain imposed only when the line is bent over sheaves
3. To allow for the strain imposed by jerky movements and when the line is bent over sheaves
4. To allow for the difference in the various types of fibers used

5-53 What is the formula for finding the SWL of fiber line (in pounds)?

1. $SWL = D \times 150$
2. $SWL = C \times 150$
3. $SWL = D^2 \times 150$
4. $SWL = c^2 \times 150$

5-54 What is the SWL of a fiber line whose circumference is 6 inches?

1. 1,800 pounds
2. 2,400 pounds
3. 3,800 pounds
4. 5,400 pounds

5-55. The normal SWL for a new fiber line can be increased by what percentage?

1. 10%
2. 20%
3. 30%
4. 40%

5-56. A used fiber line in good condition has what safety factor figured in?

1. Eight
2. Six
3. Three
4. Four

IN ANSWERING QUESTIONS 5-57 THROUGH 5-59, SELECT THE TYPE OF STEEL IN COLUMN B THAT IS BEST DESCRIBED BY THE STATEMENT IN COLUMN A. NOT EVERY RESPONSE IN COLUMN B IS USED.

	A. DESCRIPTIONS	B. STEELS
5-57.	It has a tensile strength of 200,000 to 220,000 pounds per square inch (psi).	1. Improved plow steel
5-58.	It is suitable for hauling, hoisting, and logging.	2. Plow steel
5-59.	Most of the wire rope you will use will be made of this material.	3. Mild plow steel
		4. Rail-road steel

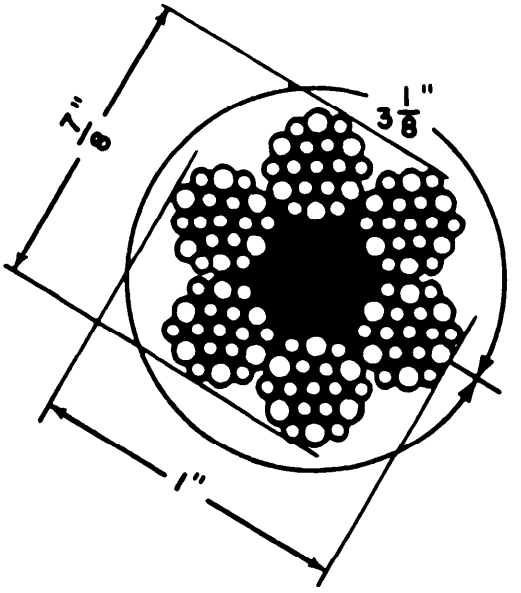


Figure SE

IN ANSWERING QUESTION 5-60, REFER TO FIGURE SE.

5-60. What is the size of the wire rope shown?

1. 1 inch, 6 x 19
2. 1 inch, 6 x 24
3. 3 1/8 inch, 6 x 37
4. 7/8 inch, 6 x 24

5-61. To measure the diameter of a wire rope, you should use what method?

1. Measure in one place near the middle
2. Measure in two places near the middle, 10 feet part. Average the results
3. Measure in three places, 10 feet apart. Average the results
4. Measure in three places, 5 feet apart. Average the results

5-62. What is the NAVFAC formula for finding the SWL of wire rope in tons?

1. SWL = C x 4
2. SWL = D x 4
3. SWL = C^2 x 4
4. SWL = D^2 x 4

5-63. What is the SWL, in tons, of a 1 1/2-inch wire rope?

1. 12
2. 9
3. 7
4. 6

5-64. The SWL of old wire rope should be reduced by what percentage?

1. 15%
2. 25%
3. 50%
4. 70%

Assignment 6

Textbook Assignment: "Alarm Systems." Pages 7-1 through 7-28.

Learning Objective: Recognize the principles of operation of a fire alarm system.

6-1. The primary purpose of a building alarm system is to

1. test the sprinkler system
2. close fire doors and shut down fans
3. protect life, property, and continuity of operations
4. provide a convenient method for having fire drills

6-2. The capabilities of a noncoded alarm system are such that it

1. can identify the location of the device causing the alarm
2. may identify the source of the alarm by using an annunciator system
3. may cause bells to ring in a distinctive pattern
4. may cause audible signals to sound in a march-time cadence

6-3. A multiplex alarm system is considered to be

1. coded
2. noncoded
3. old-fashioned
4. an undesirable and nonapproved installation

6-4. The trend in operating voltage for solid-state-control circuitry is toward

1. low-voltage dc
2. high-voltage dc
3. low-voltage ac
4. high-voltage ac

IN ANSWERING QUESTIONS 6-5 AND 6-6, REFER TO TEXTBOOK FIGURE 7-2.

6-5. A building fire alarm power supply typically does NOT contain which of the following devices?

1. Relays
2. Initiating devices
3. Terminals
4. Transformers

6-6. Fuse F2 protects against circuit defects that would cause

1. ac power failure
2. transformer short circuit
3. battery overload
4. diode bridge failure

6-7. A fire alarm system power supply does NOT perform which of the following functions?

1. Convert ac line voltage to low-voltage ac
2. Rectify low-voltage ac to produce low-voltage dc
3. Charge the system standby battery
4. Directly power the building fans

6-8. some smoke detectors require power supplies that can be described in which of the following ways?

1. More sophisticated than the power supplies required by other parts of the fire alarm system
2. Less sophisticated than the power supplies required by other parts of the fire alarm system
3. Half-wave power supplies
4. Saw-tooth wave power supplies

6-9. The control unit continuously monitors the circuit wiring to indicate a/an

1. ac power failure
2. dirty smoke detector
3. defective fire alarm bell
4. defective sprinkler control valve

6-10. The feature in fire alarm systems that warns of potential or actual electrical problems is known as

1. signal monitoring
2. sprinkler supervision
3. electrical supervision
4. trouble monitoring

6-11. If an open fault occurs in a supervised circuit, how is the supervisory current typically affected?

1. It drops to zero
2. It increases, but the fault causes a false alarm
3. It increases, but the fault causes a trouble signal
4. It remains constant, but the fault causes a trouble signal

---

Learning Objective: Identify the function and operation of auxiliary equipment used in the installation of fire alarm equipment.

6-12. For which of the following reasons are building alarm systems connected to a remote signal receiving station?

1. The occupants of the building may not know how to respond to fire alarms correctly
2. The occupants of the building may be excited
3. The building may not be occupied at the time of the alarm
4. All of the above

IN ANSWERING QUESTION 6-13, REFER TO TEXTBOOK FIGURE 7-5.

6-13. Which of the following descriptive statements is correct concerning a remote station type of fire alarm system?

1. It is normally a coded system
2. It requires a pair of wires for each alarm signal
3. It provides signaling from transmitters of the municipal type
4. It does not use annunciation

6-14. Which of the following devices is used to control ventilation fan operation by using fire alarm system power supply?

1. Double-throw-over switch
2. Remote transmitter
3. Relay with multiple contacts
4. Knife switch

6-15. Which, if any, of the following descriptions applies to the contacts of most approved initiating devices?

1. Normally open contacts that close on alarm
2. Normally closed contacts that open on alarm
3. Double sets of contacts, one pair for trouble and one pair for alarm
4. None of the above

6-16. Which, if any, of the following actions should you take to test the electrical function of a manual pull box?

1. Break the glass retainer
2. Remove the pull box and short-circuit the terminals on the back
3. Open the pull box with an appropriate tool
4. None of the above

6-17. You should test all manual devices on a rotation schedule so that all devices are tested at what frequency?

1. Monthly
2. Quarterly
3. Semiannually
4. Annually

6-18. Yost general-purpose automatic fire alarm systems are probably initiated by heat detectors.

1. True
2. False

6-19. A fixed-temperature detector may be checked for actuation by

1. supervisory current
2. visual inspection
3. signal monitoring
4. auxiliary contacts

6-20. How should a rate-compensated detector be checked for actuation?

1. By auxiliary contacts
2. By visual inspection
3. Electrically
4. Manually

6-21. Rate-of-rise detectors usually operate on the principle of

1. differential expansion of metals with temperature
2. increasing air pressure with increasing temperature
3. generation of electricity at a bond of dissimilar metals
4. melting of a metal alloy at high temperature

6-22. When should fixed-temperature detectors with fusible elements be heat tested?

1. Only when an inspection shows a possible defect
2. Quarterly
3. Every year
4. Every 5 years

6-23. Heat detectors installed in a hazardous storage area may be heat tested by using a/an

1. explosionproof lamp
2. infrared lamp
3. hair dryer
4. hot-air gun

6-24. Photoelectric smoke detectors may operate on which of the following principles?

1. The light is obscured by smoke
2. The light is reflected by smoke
3. The light is blocked or partially blocked by smoke
4. All of the above

6-25. Ionization smoke detectors can detect smoke by which of the following methods?

1. The solid smoke particles interfere with current flow in air ionized by a radio-activesource
2. A radioactive source ionizes the smoke, causing an increase in current
3. The ions in the smoke cause an increased current between two high-voltage plates

6-26. The major difference between smoke detectors of the spot and duct types is the

1. arrangement of electronic parts
2. method of powering the detector
3. method of moving smoke into the detector

6-27. A photoelectric smoke detector may need

1. periodic cleaning of the smoke chamber with detergent
2. replacement of an LED at the jobsite
3. recovery in bright light after cleaning
4. occasional removal of dust with low-pressure air

6-28. Each ionization smoke detector should be smoke tested at what frequency?

1. Monthly
2. Quarterly
3. Semiannually
4. Annually

6-29. Which of the following statements concerning the equipment manufacturer's customer service department is correct?

1. You should contact it only when all repair attempts fail
2. You should call it immediately when the equipment fails
3. Its personnel can tell you the equipment serial number if you describe the equipment
4. Its personnel may be able to give helpful repair suggestions and/or manufacturer's literature

6-30. Infrared flame detectors can distinguish flame from nonflame light sources by using which, if any, of the following devices?

1. An IR source inside the detector
2. A flicker-delay-response circuit
3. IR filters on the window of the detector
4. None of the above

6-31. The ultraviolet flame detector is extremely fast and is used in which of the following areas?

1. Berthing
2. Office spaces
3. Aircraft maintenance
4. Galleys

6-32. How is the flow of water detected in a fire alarm sprinkler system?

1. By an increase in water pressure
2. By a drop in water pressure
3. By the movement of a vane inside the pipe
4. All of the above

6-33. Alarm-indicating devices are divided into what two major categories?

1. Visual and audible
2. Smoke and heat
3. Photoelectric and ionization
4. Pressure and vane

6-34. Annunciators may provide a visual indication for which of the following areas of protection?

1. General areas or zones
2. Individual initiating devices
3. Multiple initiating devices
4. All of the above

6-35. A trouble condition is usually annunciated by using a

1. flashing light
2. yellow or amber light
3. red or pink light
4. blue or green light

6-36. An audible signal device in a fire alarm system should have a distinctive sound so that

1. the bell can be heard at a greater distance
2. this bell can be distinguished from other bells
3. a tone that causes less discomfort to the eardrums can be produced

---

Learning Objective: Discuss troubleshooting, repairs, and safety precautions associated with fire alarm systems.

6-37. When numerous wires are removed from terminals at one location, it is good practice to

1. try to remember which wire came from each terminal
2. make up a poem to remember the order of the wire colors
3. tag each wire with the terminal number it came from
4. remove all the wires first, then tag each wire with a terminal number

6-38. which of the following actions may the replaceable modules in a modular control unit do?

1. Control audible signal devices
2. Transfer power from a commercial source to standby
3. Provide a reversing output voltage for remote signaling
4. All of the above

6-39. An open fault in a power circuit usually causes which, if any, of the following results?

1. A blown fuse or tripped circuit breaker
2. An indication of power failure
3. A low-voltage dc alarm signal
4. None of the above

6-40. Which of the following is a recommended procedure for locating a short-circuit fault in an initiating circuit?

1. Assume all connections are loose, and tighten them before taking ohmmeter readings
2. Disconnect all terminals at each junction box and take ohmmeter readings
3. Divide the circuit in halves, taking ohmmeter readings until you locate the fault
4. Disconnect the end-of-line resistor and work your way back to the power source until you locate the fault

6-41. A ground fault on the neutral side of an indicating circuit will usually produce which of the following results?

1. A blown fuse or tripped circuit breaker
2. Intermittent false alarms
3. Automatic shutdown of heating and ventilation fans
4. No symptoms

6-42. What is the purpose of the joint service interior intrusion detection system (JSIIDS)?

1. To detect an intrusion
2. To prevent an attempted intrusion
3. To prevent the theft of government property

6-43. What are the two general classes of JSIIDS components?

1. The control unit and its display equipment and the monitor and its sensor components
2. The control unit and the monitor
3. The control unit and its sensor components and the monitor and display equipment
4. The control unit and its sensor and the display equipment

6-44. Where should the control unit of a JSIIDS be installed?

1. In a protected area
2. In an access area
3. In the monitor cabinet
4. In the same area as the sensors

6-45. What control unit sensor is designed to detect movement within the protected area?

1. Penetration
2. Motion
3. Point
4. Duress

6-46. What is the normal No Alarm voltage of a JSIIDS circuit to the detectors?

1. 20 volts ac
2. 20 volts dc
3. 24 volts ac
4. 24 volts dc

6-47. The signal module in the monitoring cabinet displays the status of

1. the motion sensors
2. the control unit
3. all sensors
4. the monitor cabinet power supply

6-48. What monitor module is used in the monitoring cabinet to display mode changes in the protected area?

1. Status
2. Alarm
3. Motion
4. Penetration

6-49. It is permissible to install alarm conductors in the same conduit as the building wiring.

1. True
2. False

6-50. The wire of all low-voltage conductors in the JSIIDS should be of what size?

1. No. 16 AWG
2. NO. 18 AWG
3. No. 20 AWG
4. No. 22 AWG

6-51. At what intervals should the JSIIDS be inspected?

1. Monthly
2. Quarterly
3. Semiannually
4. Annually

6-52. For an alarm condition, you should have what voltage reading on the PCB test points?

1. Zero voltage
2. 18 volts dc
3. 20 volts dc
4. 20 volts ac

6-53. What is the main point to remember when replacing JSIIDS components?

1. Get the system back on line as soon as possible
2. Ensure that all connections are properly soldered
3. Tag your conductors
4. Replace the power supply fuse after completion of repairs

STUDENT COMMENT SHEET

THIS FORM MAY BE USED TO SUGGEST IMPROVEMENTS, REPORT COURSE ERRORS, OR TO REQUEST HELP IF YOU HAVE DIFFICULTY COMPLETING THE COURSE.

NOTE: IF YOU HAVE NO COMMENTS, YOU DO NOT HAVE TO SUBMIT THIS FORM.

Date _____

FROM:

_____
RATE/RANK/GRADE, NAME (FIRST, M.I., LAST)

_____
STREET ADDRESS, APT #

_____
CITY, STATE, ZIP CODE

DSN: _____
Commercial: _____
FAX: _____
INTERNET: _____

To: COMMANDING OFFICER
NETPDTC CODE N314
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

Subj: CONSTRUCTION ELECTRICIAN 1, NAVEDTRA 82525

1. The following comments are hereby submitted:

PRIVACY ACT STATEMENT

Under authority of Title **5,** USC **301,** information regarding your military status is requested to assist in processing your comments and in preparing a reply. This information will not be divulged, without written authorization, to anyone other than those within DOD for official use in determining performance.

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DEPARTMENT OF THE NAVY

COMMANDING OFFICER
NETPDTC N314
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

OFFICIAL BUSINESS

COMMANDING OFFICER
NETPDTC N314
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

NAVEDTRA 1430/5
Stock Ordering No. 0502-LP-216-0100

PRINT OR TYPE

TITLE _____ NAVEDTRA _____

NAME _____ ADDRESS _____
Last First Middle Street/Ship/Unit/Division, etc.

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City or FPO State Zip

RANK/RATE ____ SOC. SEC. NO. _____ DESIGNATOR _____ ASSIGNMENT NO. _____

☐ USN ☐ USNR ☐ ACTIVE ☐ INACTIVE OTHER (Specify) _____ DATE MAILED _____

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